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2003 soybean disease and future management

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INTEGRATED CROP MANAGEMENT

2003 soybean disease and future management

Overview

Diseases are an important factor in our management to stabilize soybean yield. Weather in a growing season dictates the types of disease outbreaks. In the past 10 years, outbreaks of diseases have varied from season to season and 2003 was no exception. Early in the season, rainfall was excessive and some fields were flooded. There were reports on occurrence of Phytophthora and seedling diseases in Iowa. Cool and wet early summer was also favorable to white mold infections and the disease appeared in eastern Iowa with reported infections over 70 percent diseased plants in some fields. After mid-season, drought occurred, which stopped white mold development. Soybean producers experienced first-time outbreaks of soybean aphids and soybean charcoal rot. In this growing season, soybean yield was down 28 percent compared with last year's yield and diseases and insects no doubt contributed to this reduction, although quantitative data is not available.

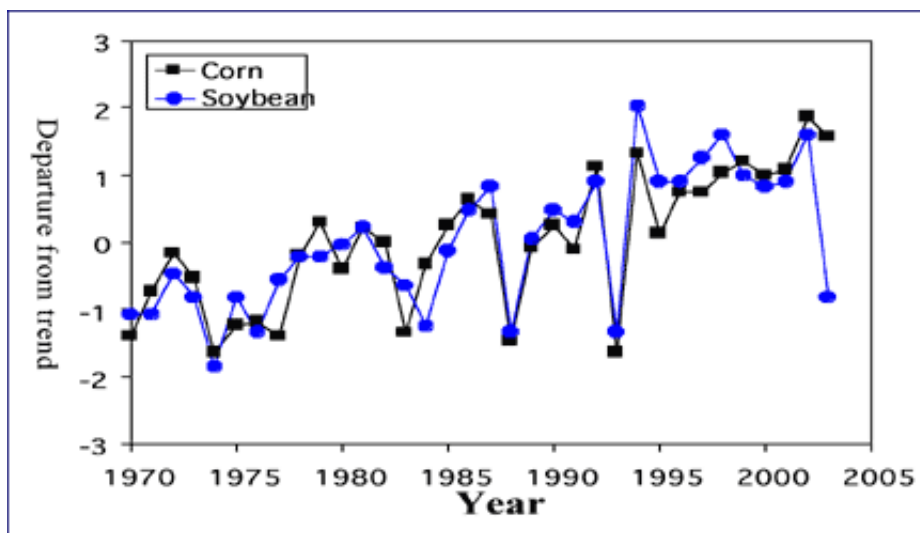
Although we do not have sufficient data to estimate yield loss caused by these diseases and insects, examining and comparing yield data between soybean and corn over years in Iowa may provide some clue of their effects in association with weather on stability of yields. Annual departure of soybean yield or corn yield from historical trend was calculated using following formula:

$$\text{Departure from trend} = (\text{annual yield} - \text{historical mean}) / \text{standard deviation}$$

Then a plot can be made to show the variation in departure of soybean yield or corn yield from trend. Historically, fluctuations of soybean yields were consistent with corn yields. A year good for soybean was also good for corn, except for two years. The pattern was broken this year. 2003 had the greatest departure of soybean yield from historical trend while corn yield had a minor change. This may have been the result of two factors: 1) drought affected soybean not corn since it occurred after corn flowering, and 2) there were pest outbreaks in soybean (aphids and charcoal rot) but not in corn. The charcoal rot outbreak was associated with drought.

Quantitatively, we cannot determine the amount of effects of insects and diseases in 2003 yield. Figure 1, however, indicates the increasing challenge of diseases or pests to our efforts in stabilizing yield. Below I will discuss the risk and management of three diseases. Soybean charcoal rot management is covered in a separate article in the January issue of this newsletter.

Figure 1. Departure of soybean or corn yield from trend.



SMV management

Soybean mosaic virus (SMV) currently is not a production problem as the level of disease is very low, but a major concern of pathologists. SMV is a seedborne disease. Yield loss up to 50% has been reported in the southern United States and loss is severe when SMV and bean pod mottle virus (BPMV) occur together. Increase in population of soybean aphid, which vectors this disease during a growing season, increases the risk of SMV in Iowa. As we learned from the epidemics of bean pod mottle virus in the North Central Regions, epidemics of the viral disease were followed with the increase of bean leaf beetles which vector BPMV. In future management, it will be effective to prevent the build-up of infected seeds in seed chain. Test seed when discolored seeds were significant from a field which had a high level infestation of soybean aphid. Effective control of soybean aphid population also helps reduce disease risk.

SDS next season

SDS was prevalent in Iowa in the 2002 growing season and severe infections were found in many soybean fields. The risk of reoccurrence of SDS in these infested fields would be high if soybean is planted early in a wet spring and then followed by a normal growing season. Since long-term weather prediction has great uncertainty, we can not predict the occurrence of SDS with confidence. Selecting SDS resistant/tolerant varieties for the fields where the disease was severe in 2002 will be a wise move.

Return of white mold

The risk of white mold return also depends on the weather conditions of next season. If we have an early planting, followed by a cool and wet summer, risk of the disease cannot be underestimated as we found this year. Occurrence of white mold in many soybean fields indicates that there may have been significant white mold fungus in Iowa soybean fields. The disease could return once weather and planting conditions are favorable.

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<http://www.ipm.iastate.edu/ipm/icm//ipm/icm/2003/12-15-2003/soydis.html>

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